

WHAT IS CLAIMED IS:

1. A vehicle suspension system, comprising:
5 an axle;
a sleeve clamped on the axle without press-fitting, the sleeve being welded
in its clamped position; and
an arm attached to the axle by welding directly to the sleeve.

10 2. The suspension system according to Claim 1, wherein the arm
includes a generally U-shaped portion having opposing side walls, and a plate
extending between the side walls and welded to each of the side walls, the plate
further being welded to the sleeve.

15 3. The suspension system according to Claim 2, wherein the sleeve
includes a generally radially outwardly extending clamp portion, and wherein the
plate is welded to the clamp portion.

20 4. The suspension system according to Claim 1, wherein the sleeve is
welded in its clamped position by a weld extending between structural members
of a generally radially outwardly extending clamp portion of the sleeve.

5. The suspension system according to Claim 1, wherein the sleeve is welded to the axle in at least one opening formed laterally through the sleeve.

6. The suspension system according to Claim 1, wherein the sleeve is
5 welded to the arm at openings formed through opposing side walls of the arm.

7. The suspension system according to Claim 6, wherein the side walls are welded to the sleeve less than 360 degrees about the sleeve.

8. The suspension system according to Claim 6, wherein the openings
10 in the side walls extend less than 360 degrees about the sleeve.

9. The suspension system according to Claim 8, wherein each of the side walls includes a void extending between the respective side wall opening and
15 a peripheral edge of the side wall, and wherein a clamp portion of the sleeve is received in each of the voids.

10. The suspension system according to Claim 9, wherein the arm includes at least one plate welded to and extending between each of the side
20 walls, and wherein the plate is welded to the clamp portion extending outwardly from the void in each side wall.

11. The suspension system according to Claim 1, further comprising a shock absorber attached to the sleeve.

12. The suspension system according to Claim 11, wherein the shock
5 absorber is attached to the sleeve via a bracket welded directly to the sleeve.

13. The suspension system according to Claim 11, wherein the bracket is welded to the sleeve without also being welded to the arm.

10 14. The suspension system according to Claim 1, wherein the sleeve extends greater than 180 degrees about the axle.

15. A vehicle suspension system, comprising:
an axle;
a sleeve clamped to the axle; and
an arm having opposing side walls, each of the side walls having an
5 opening formed therethrough, the sleeve being received in each of the openings,
and the sleeve being welded to the arm less than 360 degrees about a periphery of
each of the openings.

16. The suspension system according to Claim 15, wherein the sleeve is
10 clamped to the axle in a manner producing a compressive stress between the
sleeve and the axle.

17. The suspension system according to Claim 16, further comprising at
least one fastener in a clamp portion of the sleeve, the compressive stress being
15 produced when the fastener is tightened.

18. The suspension system according to Claim 17, wherein the clamp
portion extends in a void formed in each of the side walls between the respective
opening and a peripheral edge of the side wall.

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19. The suspension system according to Claim 18, wherein the arm further includes at least one plate attached to and extending between the side walls, the plate being welded to the sleeve.

5 20. The suspension system according to Claim 19, wherein the plate is welded to the clamp portion of the sleeve.

21. The suspension system according to Claim 20, wherein the plate is welded to the clamp portion extending outwardly from the void in each side wall.

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22. The suspension system according to Claim 15, wherein the sleeve extends greater than 180 degrees about the axle.

23. A method of fabricating a vehicle suspension system, the method comprising the steps of:

clamping a sleeve to an axle without press-fitting;

welding the sleeve, thereby retaining the sleeve in its clamped position;

5 and

welding the sleeve to each of opposing side walls of an arm, the sleeve being welded less than 360 degrees about an opening formed through each of the side walls.

10 24. The method according to Claim 23, wherein the step of welding the sleeve in its clamped position further comprises welding together members of a clamp portion of the sleeve.

25. The method according to Claim 24, further comprising the step of
15 welding the clamp portion to at least one plate of the arm extending between and attached to each of the side walls.

26. The method according to Claim 25, further comprising the step of
welding the plate to the side walls after the step of welding the sleeve to the side
20 walls.

27. The method according to Claim 25, further comprising the step of welding the plate to the side walls prior to the step of welding the sleeve to the side walls.

5 28. The method according to Claim 23, wherein the clamping step further comprises tightening at least one fastener in a clamp portion of the sleeve.

29. The method according to Claim 28, further comprising the step of removing the fastener from the clamp portion after the step of welding the sleeve
10 in its clamped position and prior to the step of welding the sleeve to the side walls.

30. The method according to Claim 23, wherein in the clamping step, the sleeve extends greater than 180 degrees about the axle.

31. A method of fabricating a vehicle suspension system, the method comprising the steps of:

clamping a sleeve to an axle without press-fitting, thereby removing clearance between the sleeve and axle, and applying a compressive stress between
5 the sleeve and axle;

welding the sleeve to the axle; and

welding opposing side walls of an arm to the sleeve.

32. The method according to Claim 31, further comprising the step of
10 retaining the compressive stress between the sleeve and axle by welding together members of the sleeve.

33. The method according to Claim 32, wherein in the retaining step the sleeve members are included in a clamp portion of the sleeve.

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34. The method according to Claim 33, wherein the clamping step further comprises tightening a fastener in the members of the clamp portion.

35. The method according to Claim 33, wherein the step of welding the
20 side walls to the sleeve further comprises welding the side walls to the clamp portion of the sleeve.

36. The method according to Claim 33, wherein in the step of welding the side walls to the sleeve, the clamp portion is positioned at least partially between the side walls.

5 37. The method according to Claim 33, wherein in the step of welding the side walls to the sleeve, the clamp portion extends in a void formed between each of the respective openings and a peripheral edge of the side wall.

10 38. The method according to Claim 37, wherein in the step of welding the side walls to the sleeve, the clamp portion extends outwardly beyond the side wall peripheral edges.

15 39. The method according to Claim 31, further comprising the step of welding a shock absorber mounting bracket to the sleeve, without welding the mounting bracket to the arm.

40. The method according to Claim 31, further comprising the step of welding a plate to the sleeve, the plate extending between the side walls.

20 41. The method according to Claim 40, wherein the step of welding the plate to the sleeve further comprises welding the plate to a clamp portion of the sleeve.

42. The method according to Claim 40, further comprising the step of welding the plate to each of the side walls prior to the step of welding the plate to the sleeve.

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43. The method according to Claim 40, further comprising the step of welding the plate to each of the side walls after the step of welding the plate to the sleeve.

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44. The method according to Claim 31, wherein in the clamping step, the sleeve extends greater than 180 degrees about the axle.

45. A vehicle suspension system, comprising:
an axle;
a sleeve clamped on the axle by a clamp portion of the sleeve, the sleeve
being welded in its clamped position; and
5 an arm attached to the axle by welding to the sleeve.

46. The suspension system according to Claim 45, wherein the sleeve is
welded in its clamped position prior to the sleeve being welded to the axle.

10 47. The suspension system according to Claim 45, wherein the arm
includes a generally U-shaped portion having opposing side walls, and a plate
extending between the side walls and welded to each of the side walls, the plate
further being welded to the sleeve.

15 48. The suspension system according to Claim 47, wherein the plate is
welded to the clamp portion of the sleeve.

49. The suspension system according to Claim 45, wherein the sleeve is
welded in its clamped position by a weld extending between structural members
20 of the clamp portion of the sleeve.

50. The suspension system according to Claim 45, wherein the sleeve is welded to the axle in at least one opening formed laterally through the sleeve.

51. The suspension system according to Claim 45, wherein the sleeve is
5 welded to the arm at openings formed through opposing side walls of the arm.

52. The suspension system according to Claim 51, wherein the side walls are welded to the sleeve less than 360 degrees about the sleeve.

10 53. The suspension system according to Claim 51, wherein the openings in the side walls extend less than 360 degrees about the sleeve.

54. The suspension system according to Claim 53, wherein each of the side walls includes a void extending between the respective side wall opening and
15 a peripheral edge of the side wall, and wherein the clamp portion of the sleeve is received in each of the voids.

55. The suspension system according to Claim 54, wherein the arm includes at least one plate welded to and extending between each of the side
20 walls, and wherein the plate is welded to the clamp portion extending outwardly from the void in each side wall.

56. The suspension system according to Claim 45, further comprising a shock absorber attached to the sleeve.

57. The suspension system according to Claim 56, wherein the shock
5 absorber is attached to the sleeve via a bracket welded directly to the sleeve.

58. The suspension system according to Claim 56, wherein the bracket
is welded to the sleeve without also being welded to the arm.

10 59. The suspension system according to Claim 45, wherein the sleeve
extends greater than 180 degrees about the axle.

60. A method of fabricating a vehicle suspension system, the method comprising the steps of:

clamping a sleeve to an axle, thereby removing clearance between the sleeve and axle, and applying a compressive stress between the sleeve and axle;

5 then welding the sleeve to the axle; and

then welding opposing side walls of an arm to the sleeve.

61. The method according to Claim 60, further comprising the step of retaining the compressive stress between the sleeve and axle by welding together
10 members of the sleeve.

62. The method according to Claim 61, wherein the step of retaining the compressive stress is performed prior to the step of welding the sleeve to the axle.

15 63. The method according to Claim 61, wherein in the retaining step the sleeve members are included in a clamp portion of the sleeve.

64. The method according to Claim 63, wherein the clamping step further comprises tightening a fastener in the members of the clamp portion.

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65. The method according to Claim 63, wherein the step of welding the side walls to the sleeve further comprises welding the side walls to the clamp portion of the sleeve.

5 66. The method according to Claim 63, wherein in the step of welding the side walls to the sleeve, the clamp portion is positioned at least partially between the side walls.

10 67. The method according to Claim 63, wherein in the step of welding the side walls to the sleeve, the clamp portion extends in a void formed between each of the respective openings and a peripheral edge of the side wall.

15 68. The method according to Claim 67, wherein in the step of welding the side walls to the sleeve, the clamp portion extends outwardly beyond the side wall peripheral edges.

69. The method according to Claim 60, further comprising the step of welding a shock absorber mounting bracket to the sleeve, without welding the mounting bracket to the arm.

20 70. The method according to Claim 60, further comprising the step of welding a plate to the sleeve, the plate extending between the side walls.

71. The method according to Claim 70 wherein the step of welding the plate to the sleeve further comprises welding the plate to a clamp portion of the sleeve.

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72. The method according to Claim 70, further comprising the step of welding the plate to each of the side walls prior to the step of welding the plate to the sleeve.

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73. The method according to Claim 70, further comprising the step of welding the plate to each of the side walls after the step of welding the plate to the sleeve.

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74. The method according to Claim 60, wherein in the clamping step, the sleeve extends greater than 180 degrees about the axle.

75. The method according to Claim 60, wherein the step of clamping the sleeve to the axle is performed without press-fitting the sleeve onto the axle.